Operator Assisted Drive Test Report

Darjeeling & Kalimpong
West Bengal
October 2022
(RO, Kolkata)

Key Performance Indicators (KPIs):

The following Telecom Service Providers could not meet the KPIs benchmark as stated below—

AIRTEL- Rx Quality in 2G & 4G (SINR) network.

BSNL-Drop Call Rate in 2G & 3G network, Call Set up Success Rate (CSSR) in 2G & 3G network and Rx Quality in 2G & 3G (E/Io) network.

RJIO-Rx Quality (SINR) in 4G network.

VIL-Drop Call Rate (2G), Rx Quality in 4G (SINR) network.

The Operator Assisted Drive Test has been carried out by Regional Office, Kolkata with the help of Service Providers in Darjeeling & Kalimpong and surrounding areas including National Highways (110 & 717A) on 8th October & 9th October 2022 from 08.00 AM to 08.00 PM. The drive test covered drive route of 240 KMs (approx) over a period of 2 days. Approximately 341+ calls were made for each of the 7 networks: three 2G networks, one 3G network and three 4G network covering four TSPs.

| Overview | Voice Summary | Data Summary |

Overview

Darjeeling is a town and municipality in the northernmost region of the Indian state of West Bengal. Located in the Eastern Himalayas, it has an average elevation of 2,045 metres (6,709 ft). Darjeeling District is divided into four sub divisions. Namely, Darjeeling Sadar, Kurseong, Mirik and Siliguri. Darjeeling Sadar is the district headquarters. Siliguri Sub Division is the largest of the four sub divisions and Kurseong is the smallest. The district has 9 development blocks out of which 3 are in Sadar sub divison, 1 in Kurseong Sub-Division, 1 in Mirik Sub Division and remaining 4 in Siliguri Sub Division.

Kalimpong- Situated at an altitude of 1300 metres on the eastern part of Darjeeling Himalayas, the Kalimpong district was formed on 14 February 2017, after splitting from the Darjeeling district as the 21st district of West Bengal. It consists of the Kalimpong Municipality with 23 wards and three community development blocks: Kalimpong I, Kalimpong II and Gorubathan consisting of 42 gram panchayats.

The test results obtained from these drive tests were utilized to assess the network quality for Voice and Data services in terms of:

Voice: Coverage, Quality, Call Setup Success Rate, Drop Call Rate and Block Call Rate.

**Data:** Download Throughputs and Data File Success Rate.

Voice Tests: Calls were made for 90 secs duration with wait time of 5 secs between calls in all technologies. Three 2G networks, One 3G network, Three 4G networks covering 4 unique TSPs were tested.

Data Tests: Dynamic Data Service Testing was performed along same route in all technologies. 500 KB file for 2G, 20MB file for 3G and 40MB file for 4G were downloaded from FTTP server in TSP's own server. Static Data Service Testing was also performed. Three 2G (Lock Mode) networks, One 3G (Lock Mode) network, Three 4G (Lock Mode) networks covering 4 unique TSPs were tested.

Service	Static Data Service Testing- Specifications
Download	2G (Locked) - 500KB, 3G (Locked) - 20 MB, 4G (Locked) - 40 MB
Upload	2G (Locked) - 100KB, 3G (Locked) - 5 MB, 4G (Locked) - 10 MB
Web Browsing	3 links of e/m commerce website www.amazon.in, www.flipkart.com and PayTm
Video Steaming	130 secs Clip
Latency	32 Bytes on www.google.com

Technology/ TSP	AIRTEL	BSNL	RJIO	VODAFONE-IDEA
2G	YES	YES	NO	YES
3G	NO	YES	NO	NO
4G	YES	NO	YES	YES
TOOL USED	TEMS	NIMO	X-CAL	TEMS

Voice & Dynamic Data Test Drive Route
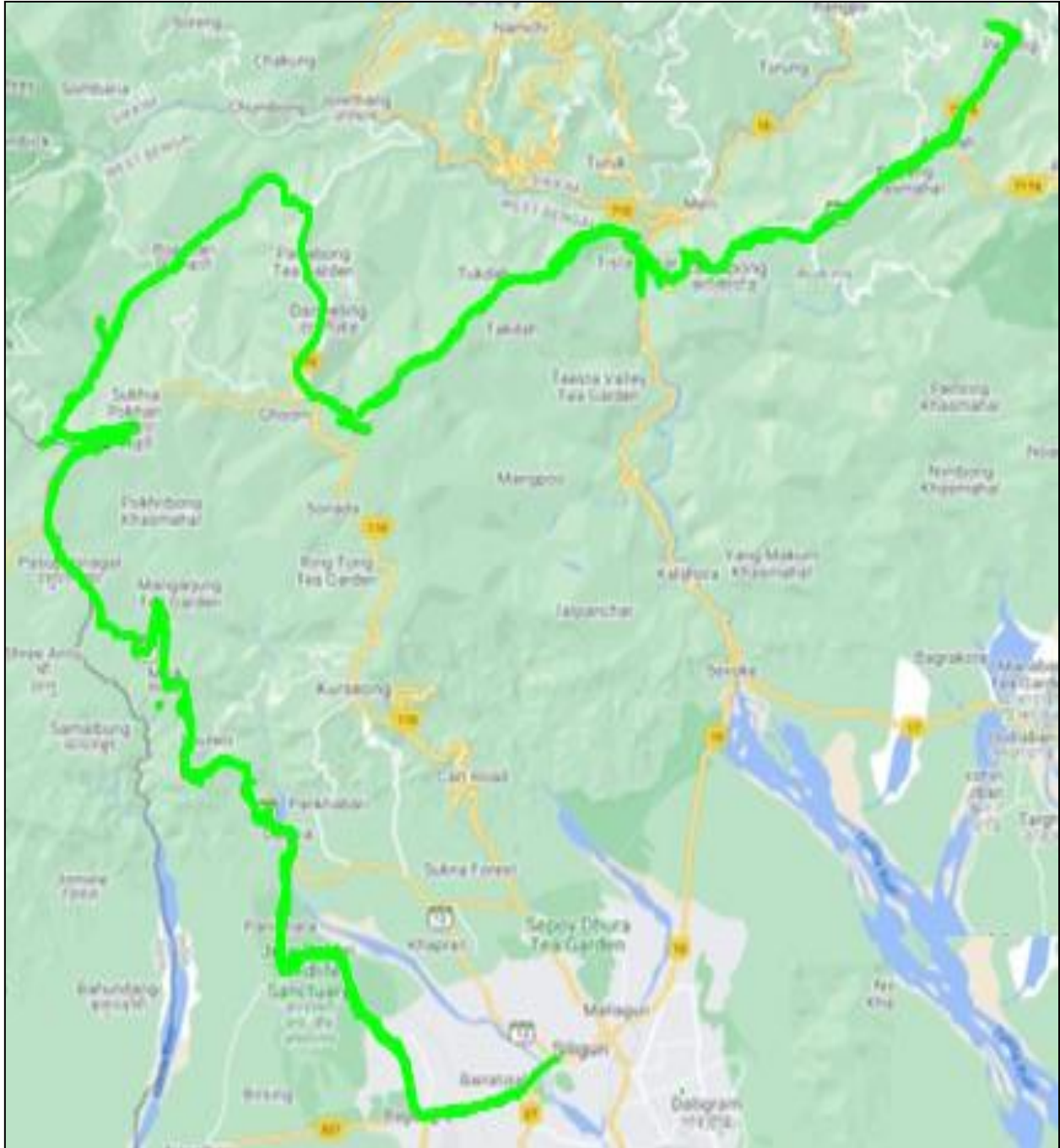
## DRIVE ROUTES OF DARJEELING TO KALIMPONG AREAS

DAY-1–Bagdogra–Belgachi–Panighata–Dhudhia–Mirik–Pashupati Customs–Simana View Point–Mane Bhanjang–Majua–Singbhumdera–Dangia–Relling-Lamagaon – Bijanbari – Pulbazar—Bhupi-Goke(I) Gram Panchayat Office-Patliabas-Rangit-I-Observatory Hill View Point – Peace Pagoda, Darjeeling –Ghoom – Tenging Norgey Road, Phulbari –Darjeeling– Chauk Bazar – Lebong Cart Road, Upper Bhutia Busty – North Point – CCC Student Connection Darjeeling – Mall Road Darjeeling – Darjeeling Clock Tower – Japanese Buddhist Temple, Darjeeling.

DAY-2– Tiger Hill Sunrise Observatory – Senchal Forest – Six Mile Bazar – Takdah-Tista Bazar – 7th Mile view point-Kalimpong – Dalapachan Khasmahal--Algarah-Pendong Gram Panchyat office – Kashyone Gram Panchayat office – Pedong Bazar Dif – Rhenak – Lingsay Khasmahal.

Voice Calls

QoS compliance of the TSPs for Voice across technologies 2G/3G/4G-VoLTE:
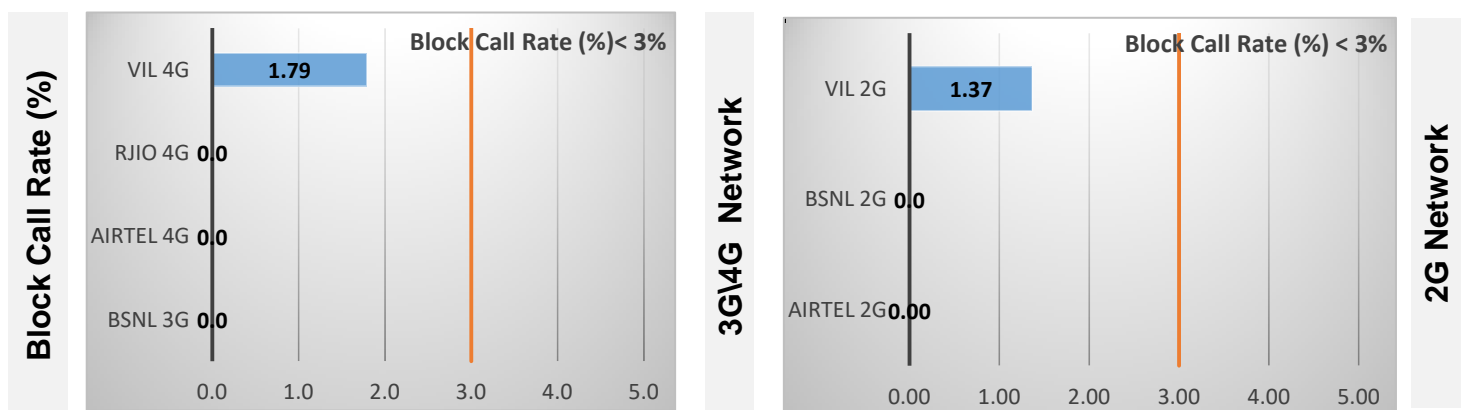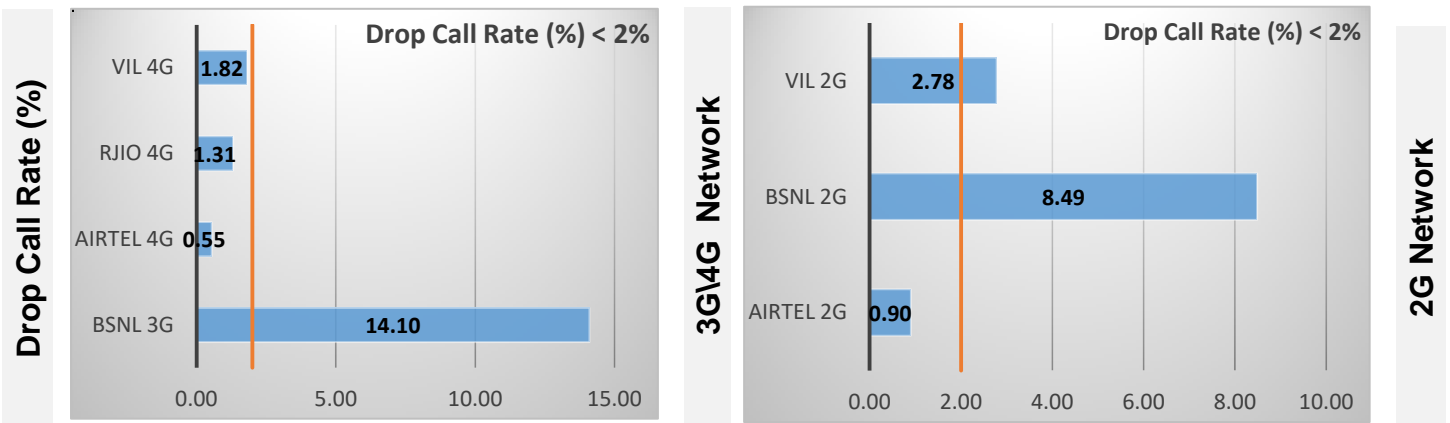
KPIs	2G			3G	4G-VoLTE		
	AIRTEL	BSNL	VIL	BSNL	AIRTEL	RJIO	VIL
Drop Call Rate %	0.90	8.49	2.78	14.10	0.55	1.31	1.82
Block Call Rate %	0.0	0.0	1.37	0.0	0.0	0.0	1.79

a) All TSPs have met the 2% QOS benchmark of Drop Call Rate (DCR%) except BSNL 2G & 3G network and VIL 2G network
b) All TSPs have met the 3% QOS benchmark of Block Call Rate (BCR).

Voice Calls

Coverage

a) **Percentage of coverage samples for 2G ≥ -85 dBm.**

TSPs	2G		
	AIRTEL	**BSNL**	**VIL**
Coverage %	89.30	54.69	91.24

b) **Percentage of coverage samples for 3G ≥ -90 dBm & LTE ≥ -110 dBm.**

TSPs	3G	4G		
	BSNL	**AIRTEL**	**RJIO**	**VIL**
Coverage %	26.42	82.60	92.96	89.77

Summary

Voice Call	2G		
	AIRTEL	BSNL	VIL
Call Attempt	332	271	219
Blocked Call Rate (%)	0.0	0.0	1.37
CSSR% (Accessibility)	100	81.92	98.63
Drop Call Rate (%)	0.90	8.49	2.78
Mobility HOSR (%)	100	95.40	97.0
Rx Quality (%)	84.70	85.15	95.67

| Voice Call	3G/4G			
	BSNL 3G	AIRTEL 4G	RJIO 4G	VIL 4G
Call Attempt	605	360	382	224
Blocked Call Rate (%)	0.0	0.0	0.0	1.79
CSSR% (Accessibility)	55.01	100	97.12	98.21
Drop Call Rate (%)	14.10	0.55	1.31	1.82
Mobility HOSR (%)	100	100	97.02	97.47
Rx Quality (%)	70.21	60.80	82.78	83.58

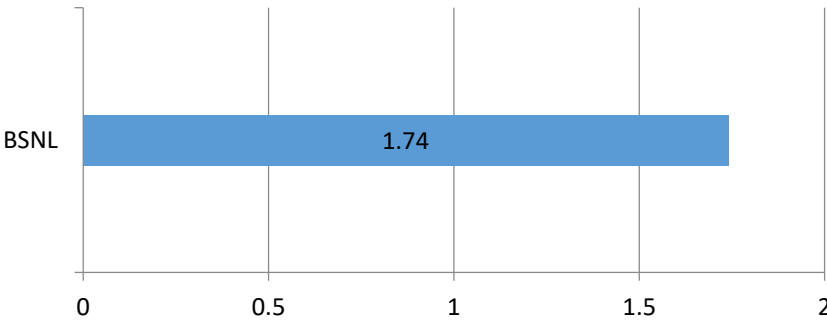Dynamic Data was tested for 240 Kms. Download Throughput was tested.

Data Download Performance (Average Throughput in Mbps) - Dynamic Data Testing

3G/4G Network:

4G-Dynamic Download Average Throuhput (Mbps)

VIL 4G	7.34
RJIO 4G	5.21
AIRTEL 4G	2.30

0.00 1.00 2.00 3.00 4.00 5.00 6.00 7.00 8.00
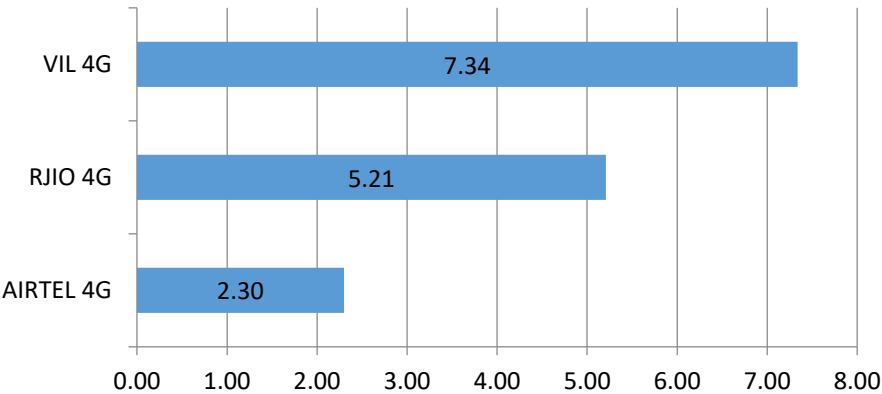
3G-Dynamic Download Average Throuhput (Mbps)


BSNL	1.74

0   0.5   1   1.5   2

RF Coverage relates to the geographical footprint within the system that has sufficient RF signal strength to provide for a call session. The Coverage rate is calculated on the basis of % of samples in which the Rx level ≥ -85 dBm, RSCP is ≥ -90 dBm & RSRP ≥ -110dBm. The details are as follows.

TSP	Coverage Rate %
AIRTEL 2G	89.30
BSNL 2G	54.69
VIL 2G	91.24
BSNL 3G	26.42
AIRTEL 4G	82.60
RJIO 4G	92.96
VIL 4G	89.77
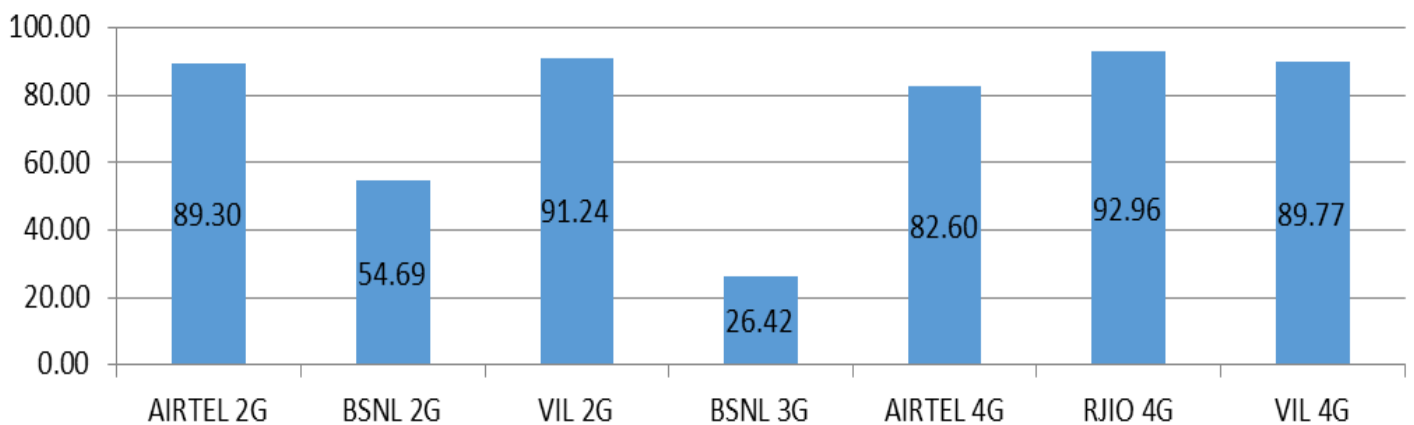
AIRTEL

Technology	Coverage Rate %
2G	89.30
4G	82.60

2G
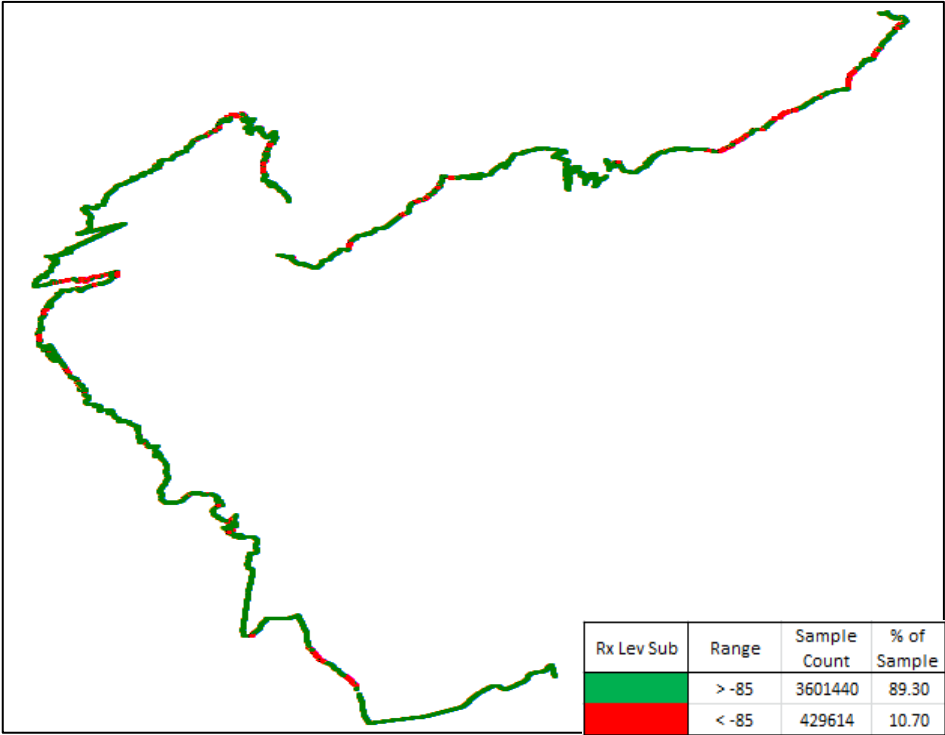
Overall RxLevel	Sample %
[Max >=-75]	18.9
[-75 >=-85)	70.4
[-85 >=-95)	7.3
[-95 >=Min)	3.4
Total	**100%**

Rx Lev Sub	Range	Sample Count	% of Sample
(green)	> -85	3601440	89.30
(red)	< -85	429614	10.70

4G
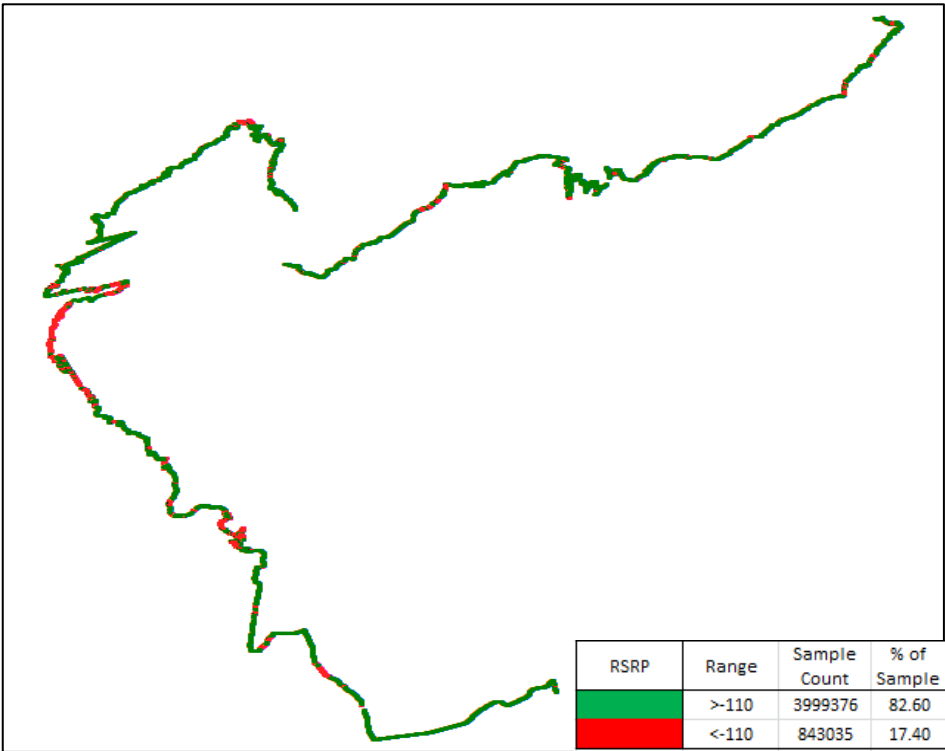
Overall RSRP	Sample %
[Max >=-80]	8.2
[-80 >=-90)	13.8
[-90 >=-110)	60.6
[-110 >=Min)	17.4
Total	**100%**

RSRP	Range	Sample Count	% of Sample
(green)	>-110	3999376	82.60
(red)	<-110	843035	17.40

BSNL

Technology	Coverage Rate %
2G	54.69
3G	26.42

2G

Overall RxLevel	Sample %
[Max >=-75]	23.36
[-75 >=-85)	31.33
[-85 >=-95)	36.08
[-95 >=Min)	9.23
Total	**100**

3G
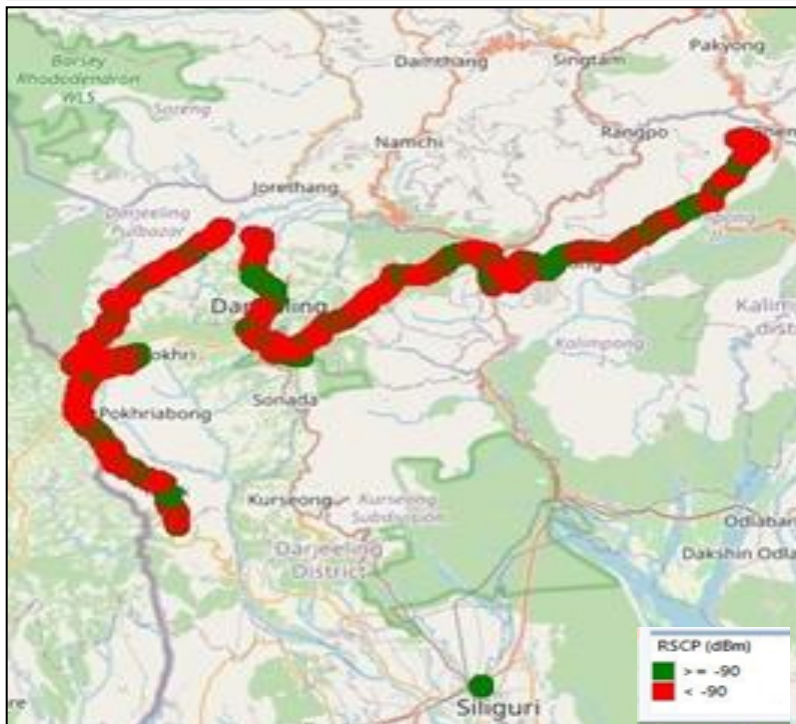
Overall RSCP	Sample %
[Max >=-70]	2.86
[-70 >=-80)	6.24
[-80 >=-90)	15.13
[-90 >=Min)	75.77
Total	**100**

RJIO

Technology	Coverage Rate %
4G	92.96

4G

Legend:
- ● -110 <= x (92.96%, 35042)
- ● x < -110 (7.04%, 2655)
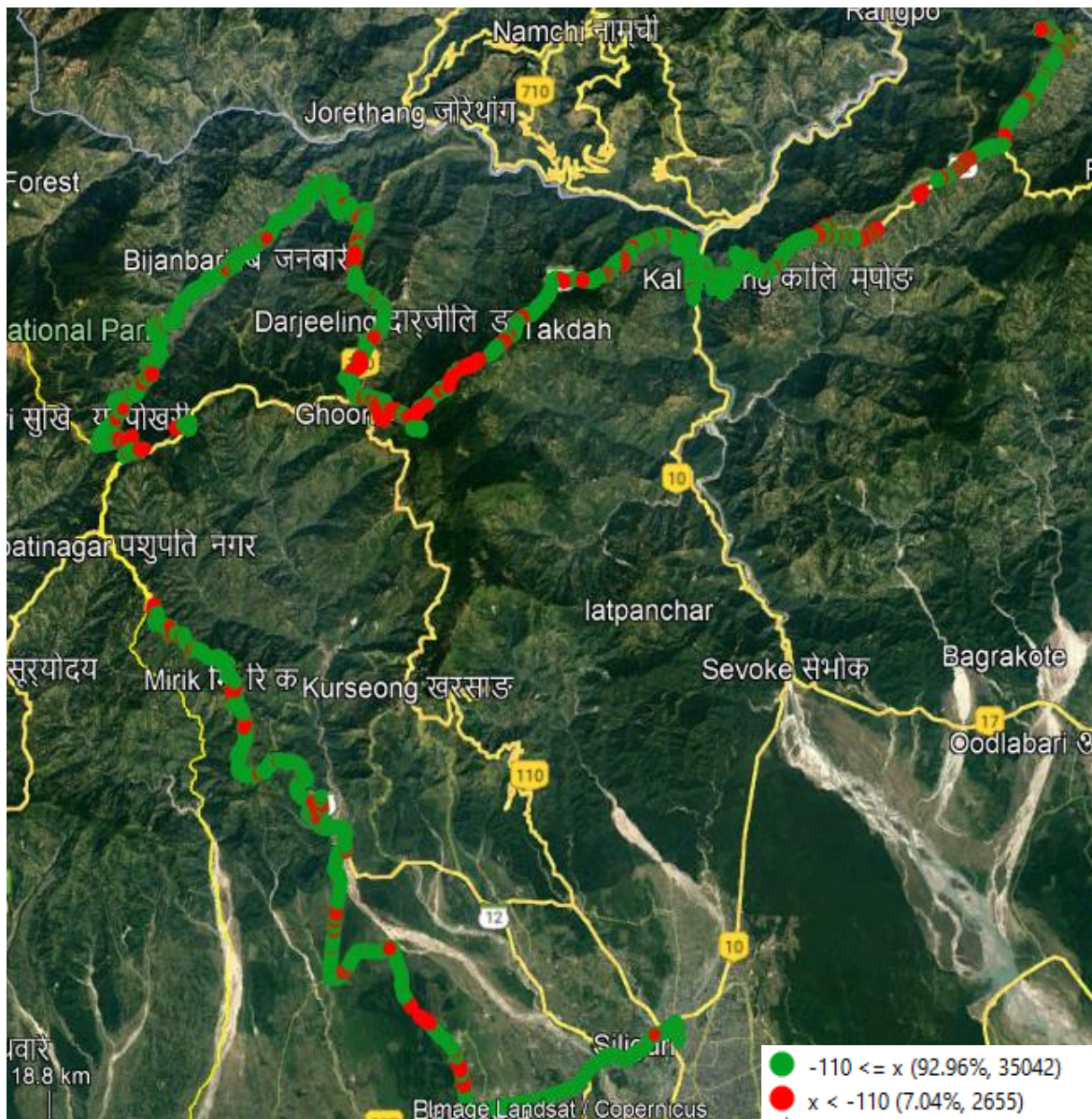
Overall RSRP	Sample %
[Max >=-80]	17.29
[-80 >=-90)	28.17
[-90 >=-110)	47.5
[-110 >=Min)	7.04
Total	**100%**

VIL

Technology	Coverage Rate %
2G	91.24
4G	89.77

2G

RXLEV_SubdBm
- ● -120 to -85 (2905257) (8.76%)
- ● -85 to 0 (30259779) (91.24%)
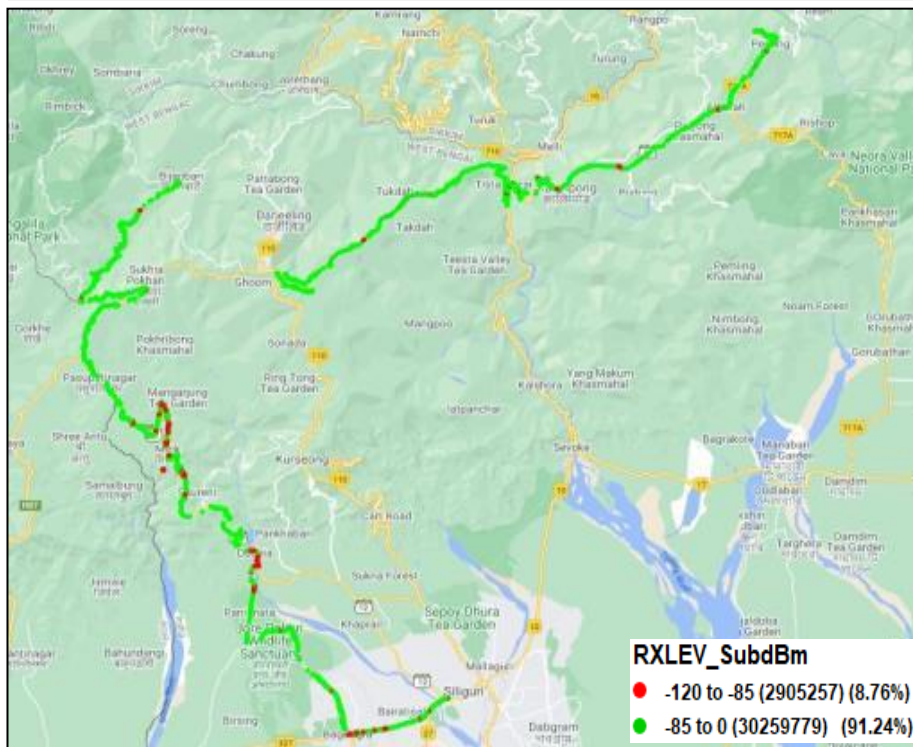
Overall RxLevel	Sample %
[Max >=-75]	49.78
[-75 >=-85)	41.46
[-85 >=-95)	3.14
[-95 >=Min)	5.62
Total	**100%**

4G

Serving Cell RSRP (dBm)
- ● -120 to -110 (5824188) (10.23%)
- ● -110 to 0 (51108248) (89.77%)
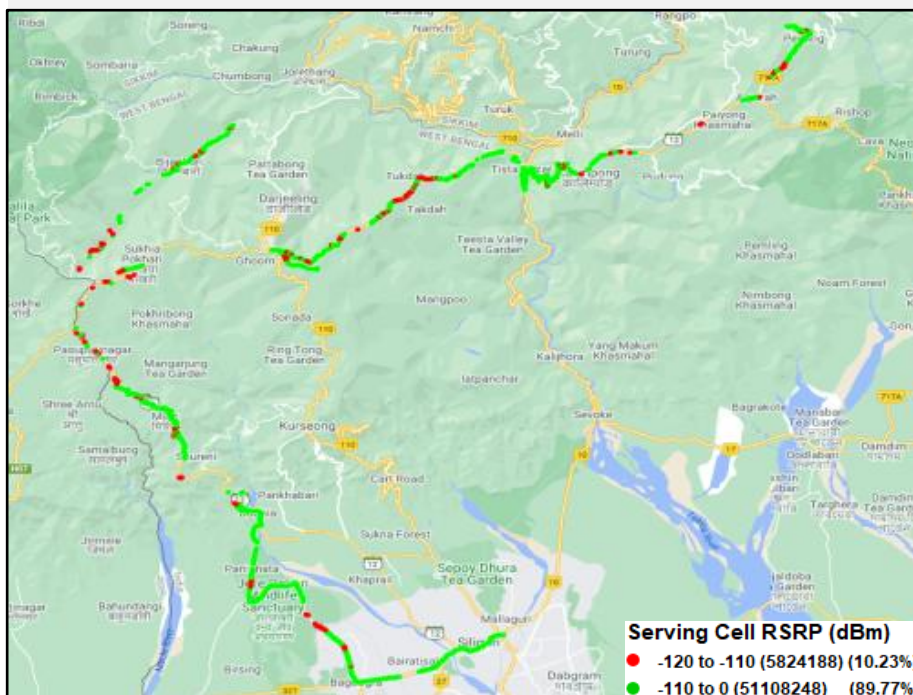
Overall RSRP	Sample %
[Max >=-80]	12.04
[-80 >=-90)	13.98
[-90 >=-110)	63.75
[-110 >=Min)	10.23
Total	**100%**

For measuring voice quality, as per the QoS norms, Rx Quality<=5 for GSM TSPs, Ec/No >= -14 dBm for 3G TSP sand SINR >0 in case of VoLTE is considered to be good, where as quality beyond this benchmark is considered to be bad. The benchmark should usually be ≥ 95%.

TSP	Rx Quality %
AIRTEL 2G	84.70
BSNL 2G	85.15
VIL 2G	95.67
BSNL 3G	70.21
AIRTEL 4G	60.80
RJIO 4G	82.78
VIL 4G	83.58

Rx Quality %
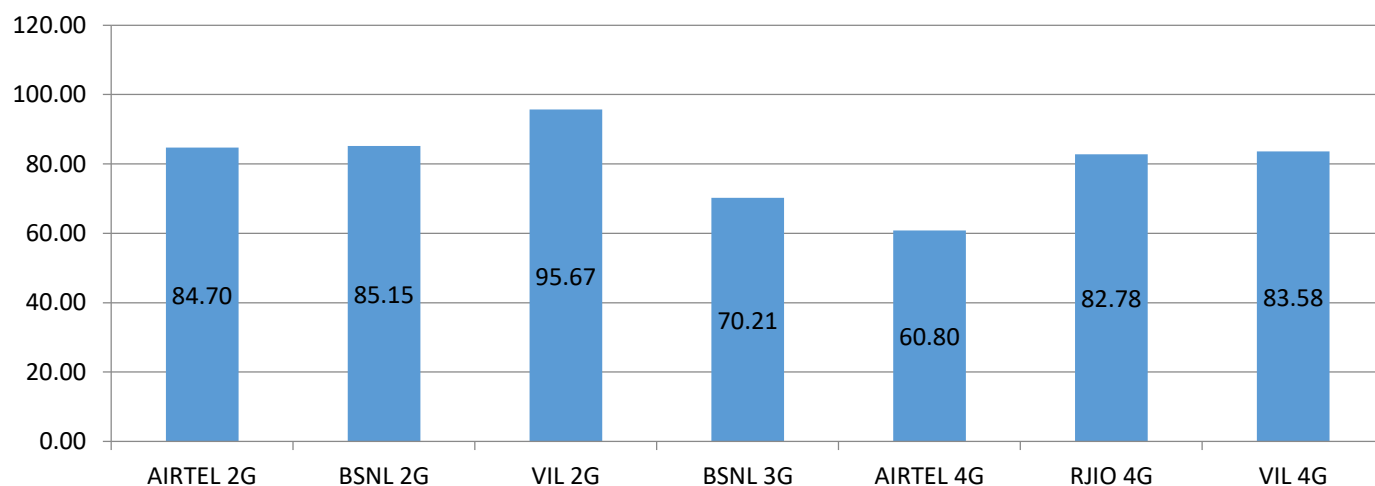
AIRTEL

Technology	Rx Quality %
2G	84.70
4G	60.80

2G
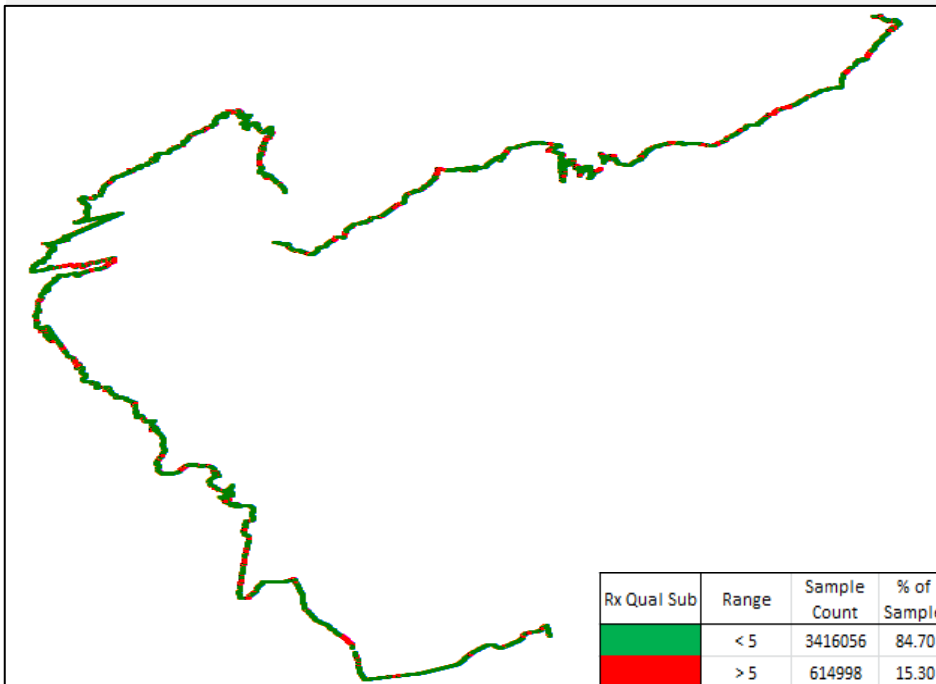
Overall Rx Quality	Sample %
(Min <=2)	74.3
(2 <=3)	3.5
(3 <=4)	3.4
(4 <=5)	3.5
(5 <=Max)	15.3
Total	**100**

Rx Qual Sub	Range	Sample Count	% of Sample
	< 5	3416056	84.70
	> 5	614998	15.30

4G
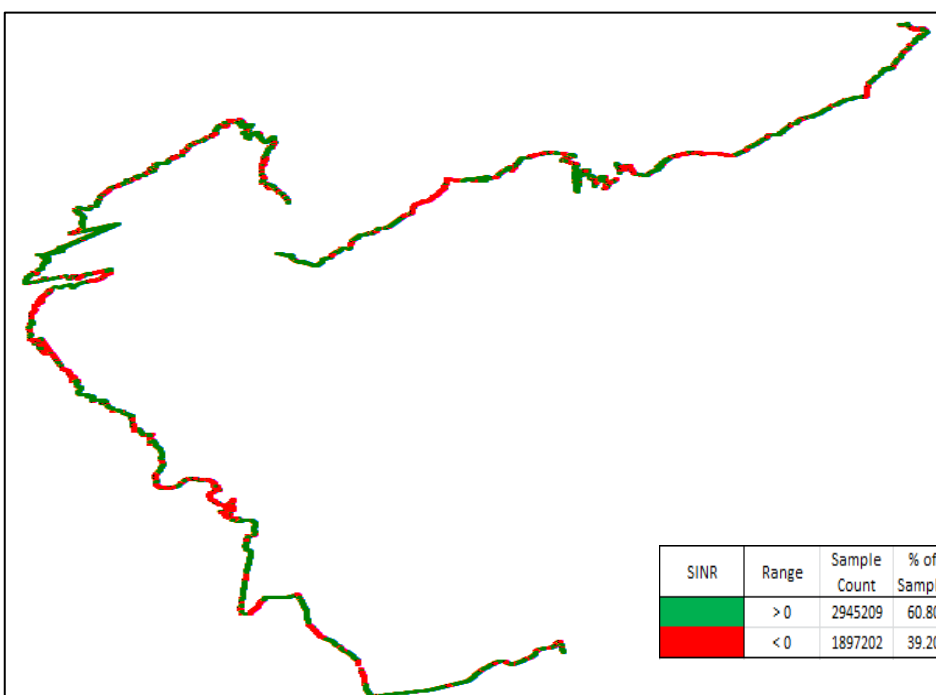
Overall SINR	Sample %
(Min <=0)	39.2
(0 <=5)	24.6
(5 <=10)	16
(10 <=15)	11
(15 <=Max)	9.2
Total	**100**

SINR	Range	Sample Count	% of Sample
	> 0	2945209	60.80
	< 0	1897202	39.20

BSNL

Technology	Rx Quality %
2G	85.15
3G	70.21

2G
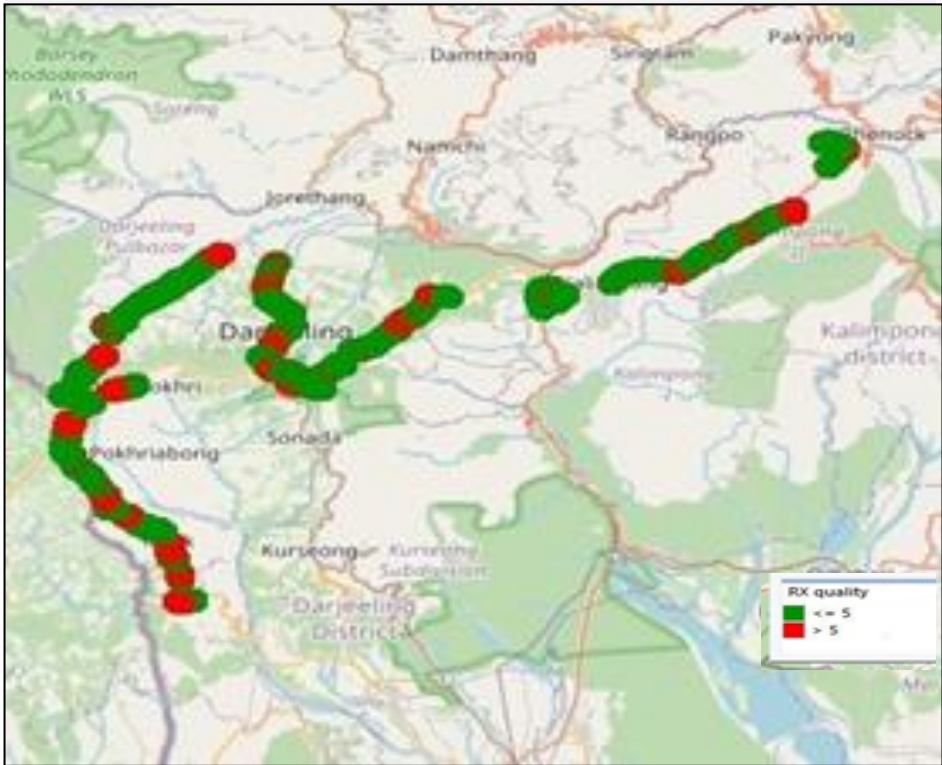
Overall Rx Quality	Sample %
(Min <=2)	71.28
(2 <=3)	4.39
(3 <=4)	5.38
(4 <=5)	4.10
(5 <=Max)	14.85
Total	**100**

3G
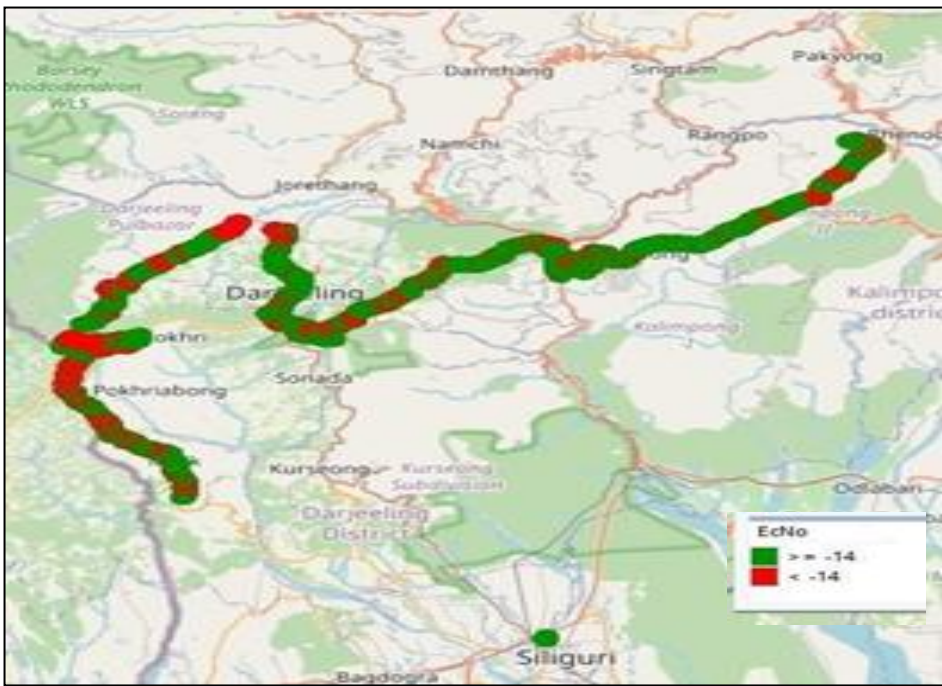
Overall EcNo	Sample %
(Max <=-6)	2.83
(-6 <=-9)	13.13
(-9 <=-11)	22.38
(-11 <=-14)	32.59
(-14 <= Min)	29.07
Total	**100**

RJIO

Technology	Rx Quality %
4G	82.78

4G
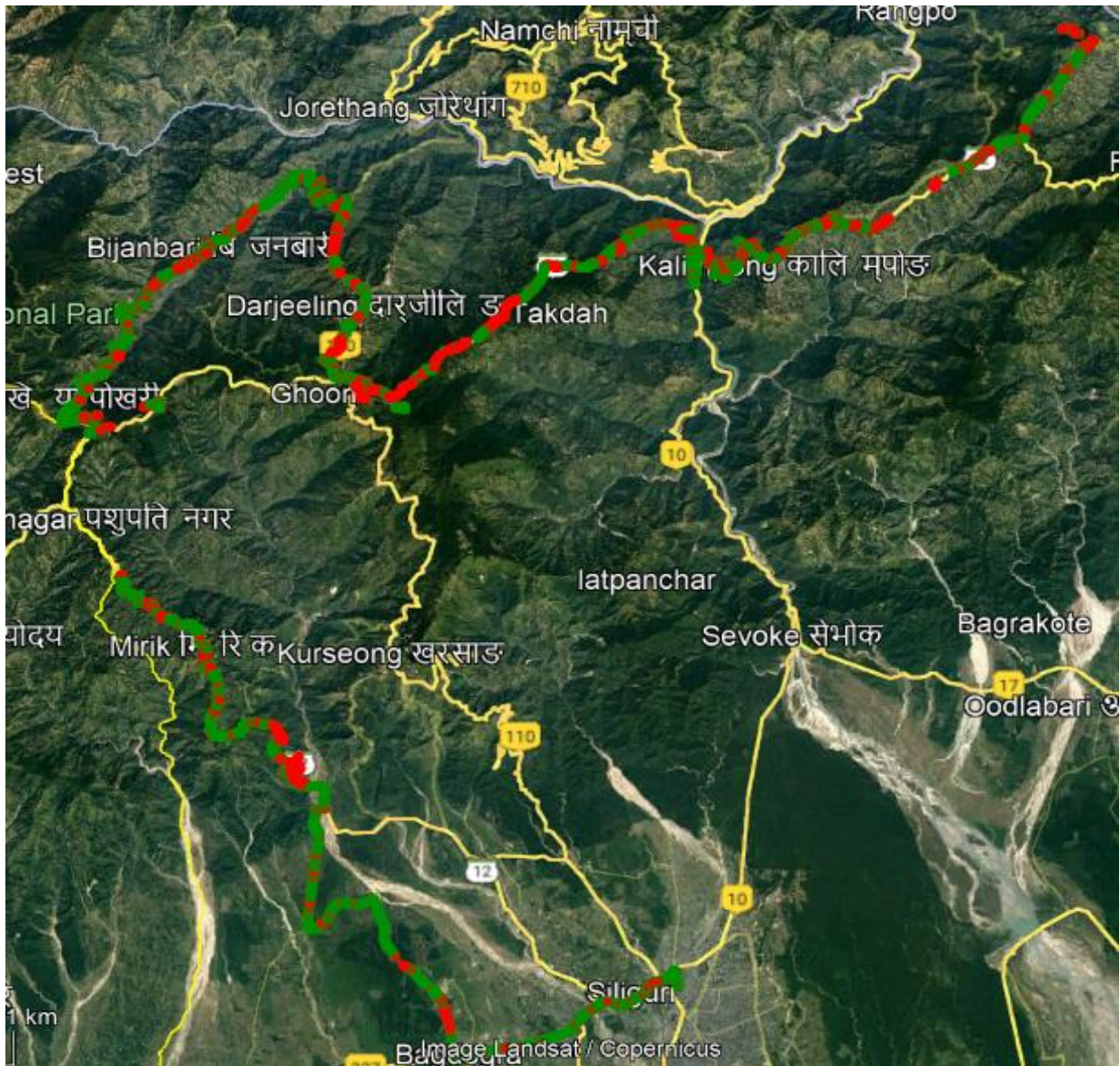
Overall SINR	Sample %
(Min <=0)	17.22
(0 <=5)	33.10
(5 <=10)	21.29
(10 <=15)	14.46
(15 <=Max)	13.94
Total	**100%**

VIL

Technology	Rx Quality %
2G	95.67
4G	83.58

2G
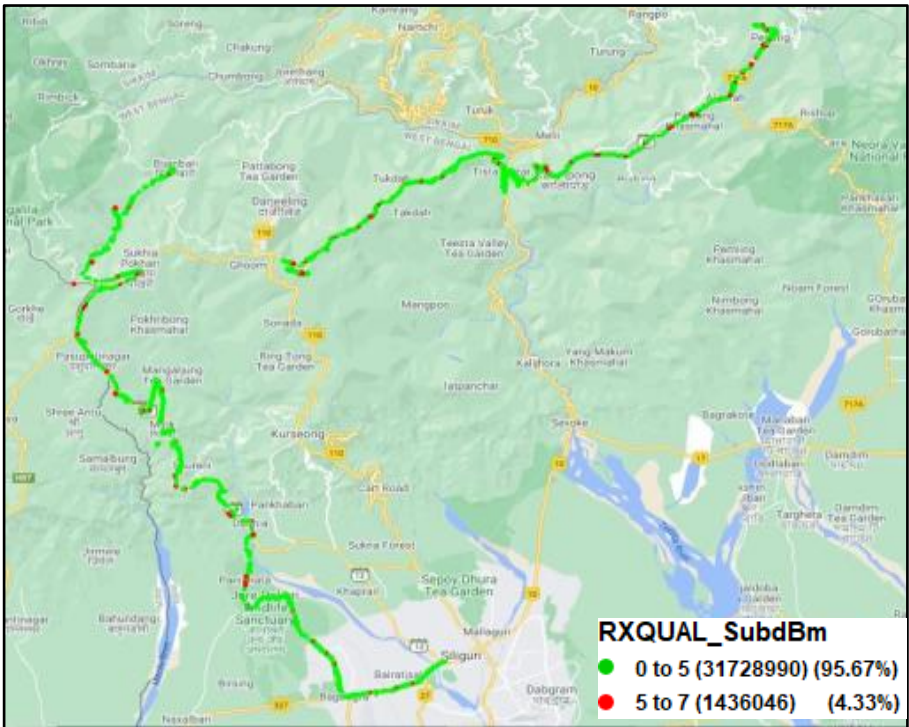
Overall Rx Quality	Sample %
(Min <=2)	79.58
(2 <=3)	5.49
(3 <=4)	6.17
(4 <=5)	4.43
(5 <=Max)	4.33
Total	**100%**

RXQUAL_SubdBm
- 0 to 5 (31728990) (95.67%)
- 5 to 7 (1436046) (4.33%)

4G
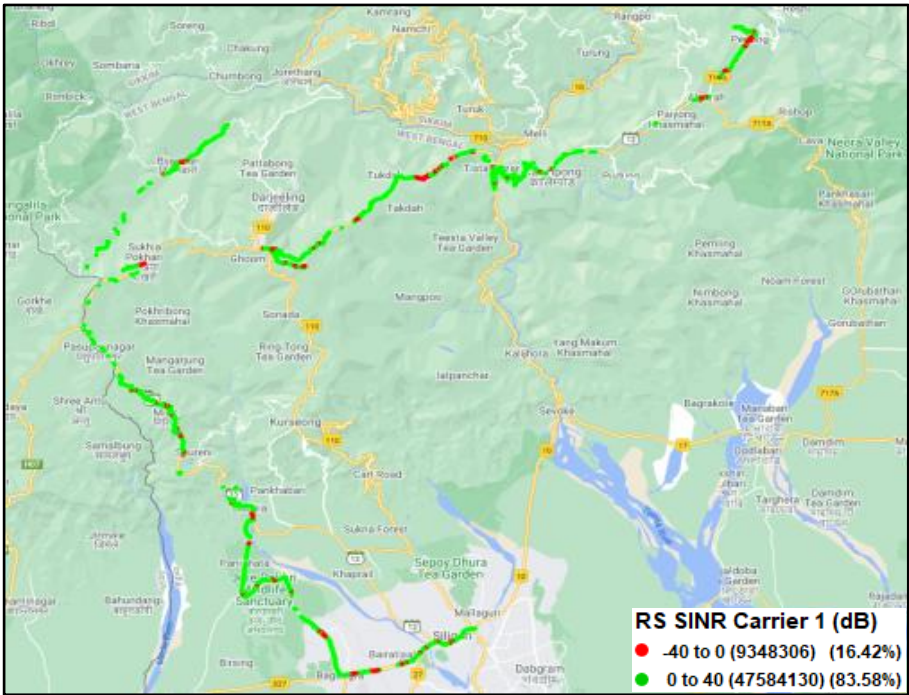
Overall SINR	Sample %
(Min <=0)	16.42
(0 <=5)	28.94
(5 <=10)	18.02
(10 <=15)	15.27
(15 <=Max)	21.35
Total	**100%**

RS SINR Carrier 1 (dB)
- -40 to 0 (9348306) (16.42%)
- 0 to 40 (47584130) (83.58%)

AIRTEL

Dynamic Data Testing Complete 240 Kms

Data KPIs - Overall	2G
Average Download Throughput (Kbps)	102.0

2G

2G Data	Range	Sample Count	% of Sample
(green)	>100 Kbps	3873461	80.00
(red)	< 100 Kbps	968950	20.00
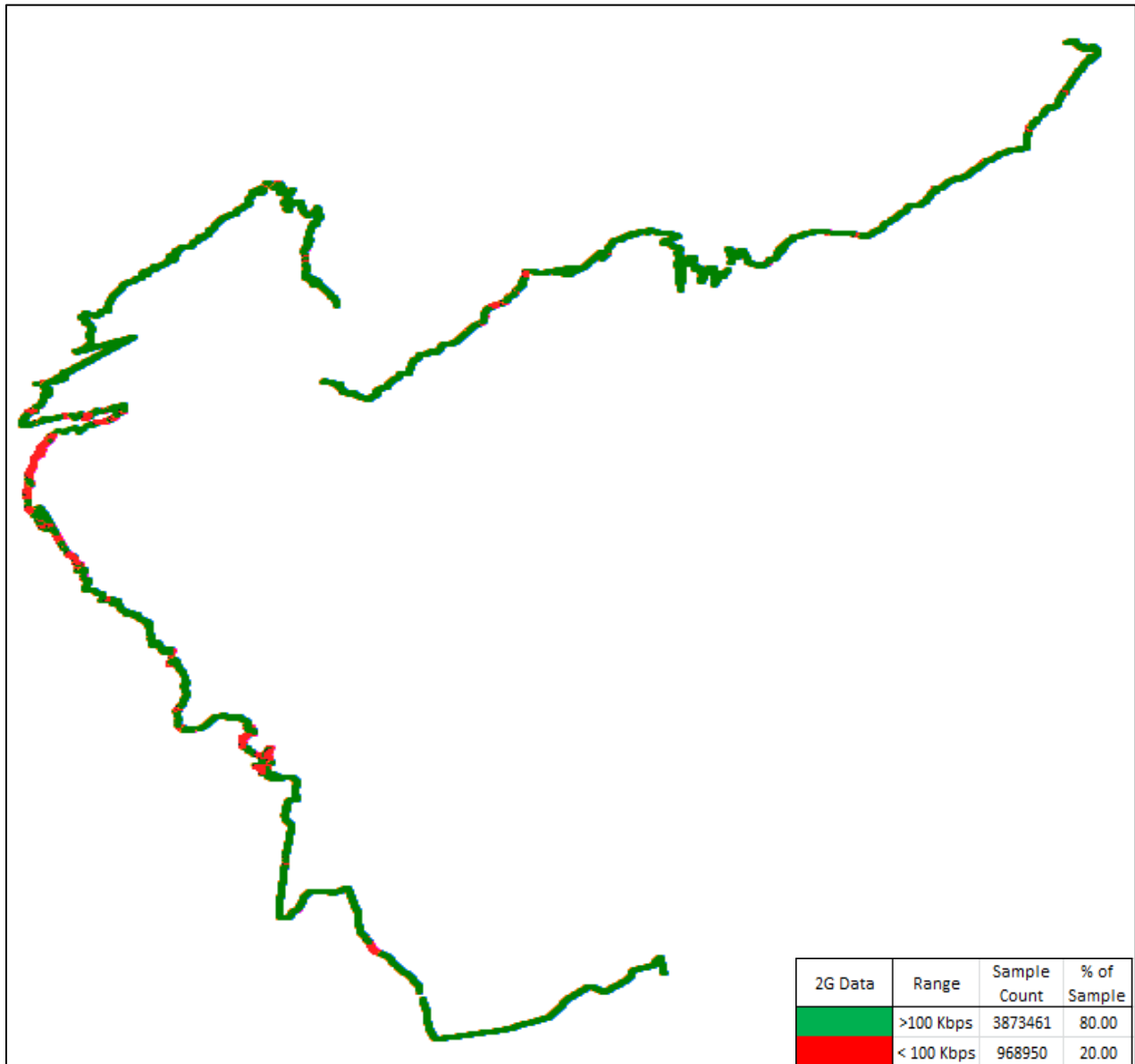
AVG. DOWNLOAD SPEED (Kbps)	102.0
% FILE TRANSFER COMPLETE	100%
DL throughput	Sample %
0 to 50 Kbps	7.6
50 to 100 Kbps	12.4
100 to 200 Kbps	45.2
200 to 300 Kbps	31.6
>300 Kbps	3.2
Total	**100%**

AIRTEL

Dynamic Data Testing Complete 240 Kms

Data KPIs - Overall	**4G**
Average Download Throughput (Mbps)	2.30

4G

4G Data	Range	Sample Count	% of Sample
(green)	>2 Mbps	3223284	65.50
(red)	<2 Mbps	1696377	34.50
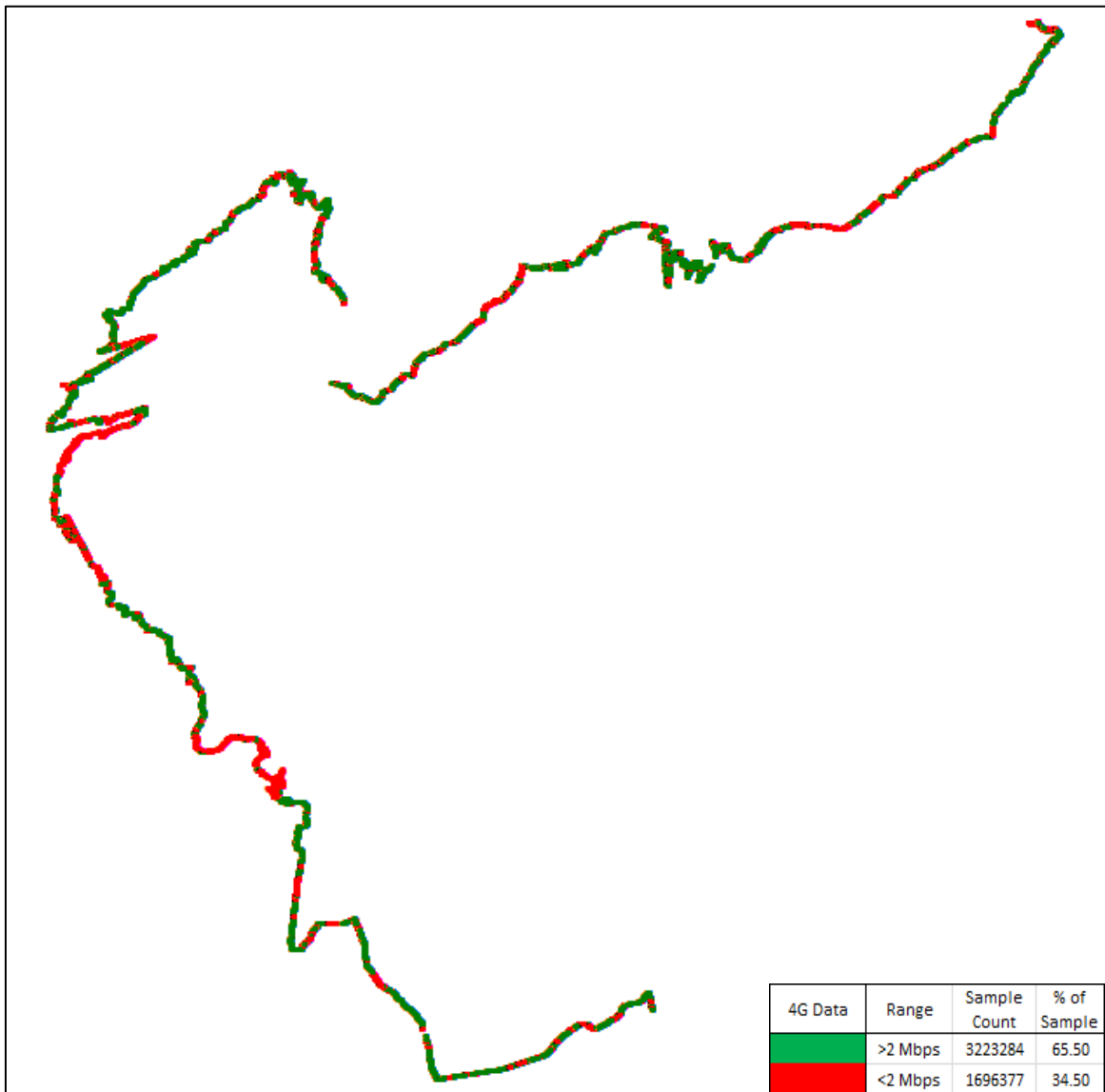
AVG. DOWNLOAD SPEED (Mbps)	2.30
% FILE TRANSFER COMPLETE	100%
DL throughput	**Sample %**
0 to 1 Mbps	32.2
1 to 2 Mbps	2.3
2 to 5 Mbps	27.8
5 to 10 Mbps	12.4
>10 Mbps	25.3
Total	**100**

BSNL

Dynamic Data Testing Complete 240 Kms

Data KPIs - Overall	2G
Average Download Throughput (Kbps)	134.25

2G
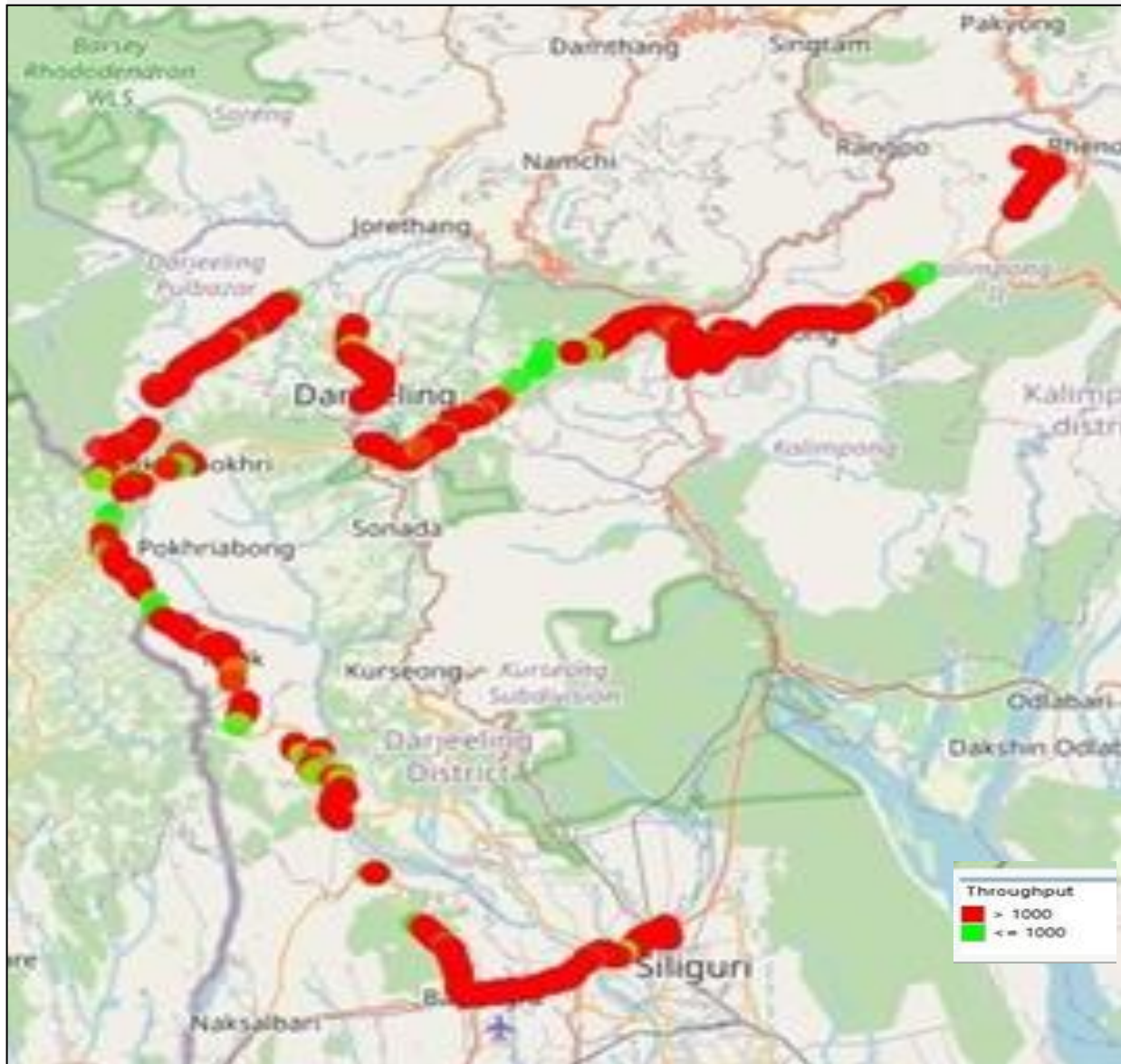
AVG. DOWNLOAD SPEED (Kbps)	134.25
% FILE TRANSFER COMPLETE	82.03%
DL throughput	Sample %
0 to 50 Kbps	4.01%
50 to 100 Kbps	1.55%
100 to 200 Kbps	1.99%
200 to 300 Kbps	2.34%
>300 Kbps	90.11%
Total	**100%**

BSNL

Dynamic Data Testing Complete 240 Kms

Data KPIs - Overall	3G
Average Download Throughput (Mbps)	1.74

3G

AVG. DOWNLOAD SPEED (Mbps)	1.74
% FILE TRANSFER COMPLETE	60.07%
DL throughput	Sample %
0 to 0.5 Mbps	29.30%
0.5 to 1 Mbps	14.53%
1 to 2 Mbps	17.85%
2 to 5 Mbps	37.43%
>5 Mbps	0.89%
Total	100

RJIO

Dynamic Data Testing Complete 240 Kms

Data KPIs - Overall	4G
Average Download Throughput (Mbps)	5.21
4G	

Legend: 2 <= x (66.23%, 24147) ; x < 2 (33.77%, 12313)
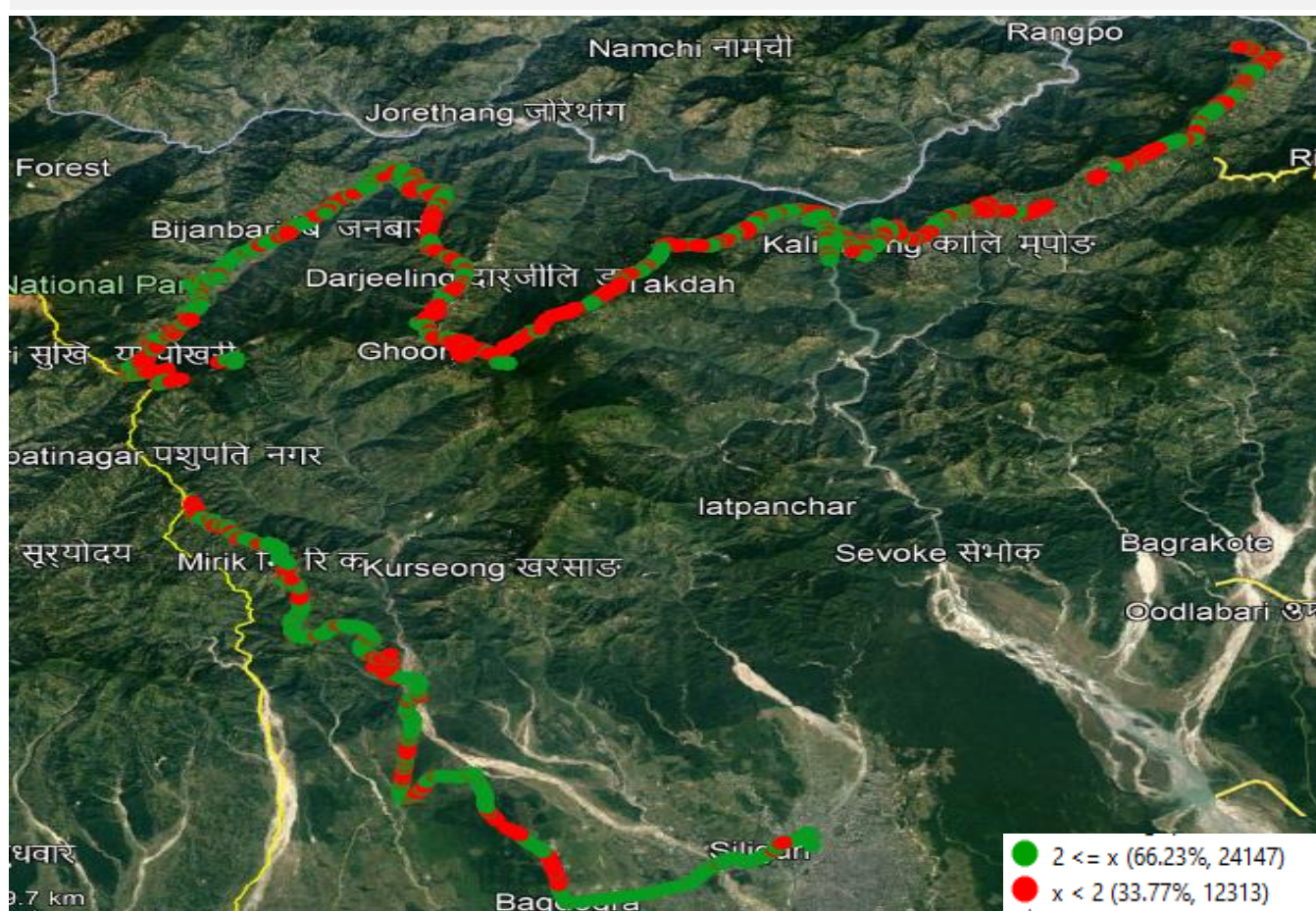
AVG. DOWNLOAD SPEED (Mbps)	5.21
% FILE TRANSFER COMPLETE	98.98%
DL throughput	**Sample %**
0 to 1 Mbps	18.30
1 to 2 Mbps	15.47
2 to 5 Mbps	41.54
5 to 10 Mbps	12.6
>10 Mbps	12.08
Total	**100%**

VIL

Dynamic Data Testing Complete 240 Kms

Data KPIs - Overall	2G
Average Download Throughput (Kbps)	83.58

2G

RLC Throughput (kbps) : DL
- Min to 100 (1964162) (61.88%)
- 100 to Max (1209984) (38.12%)
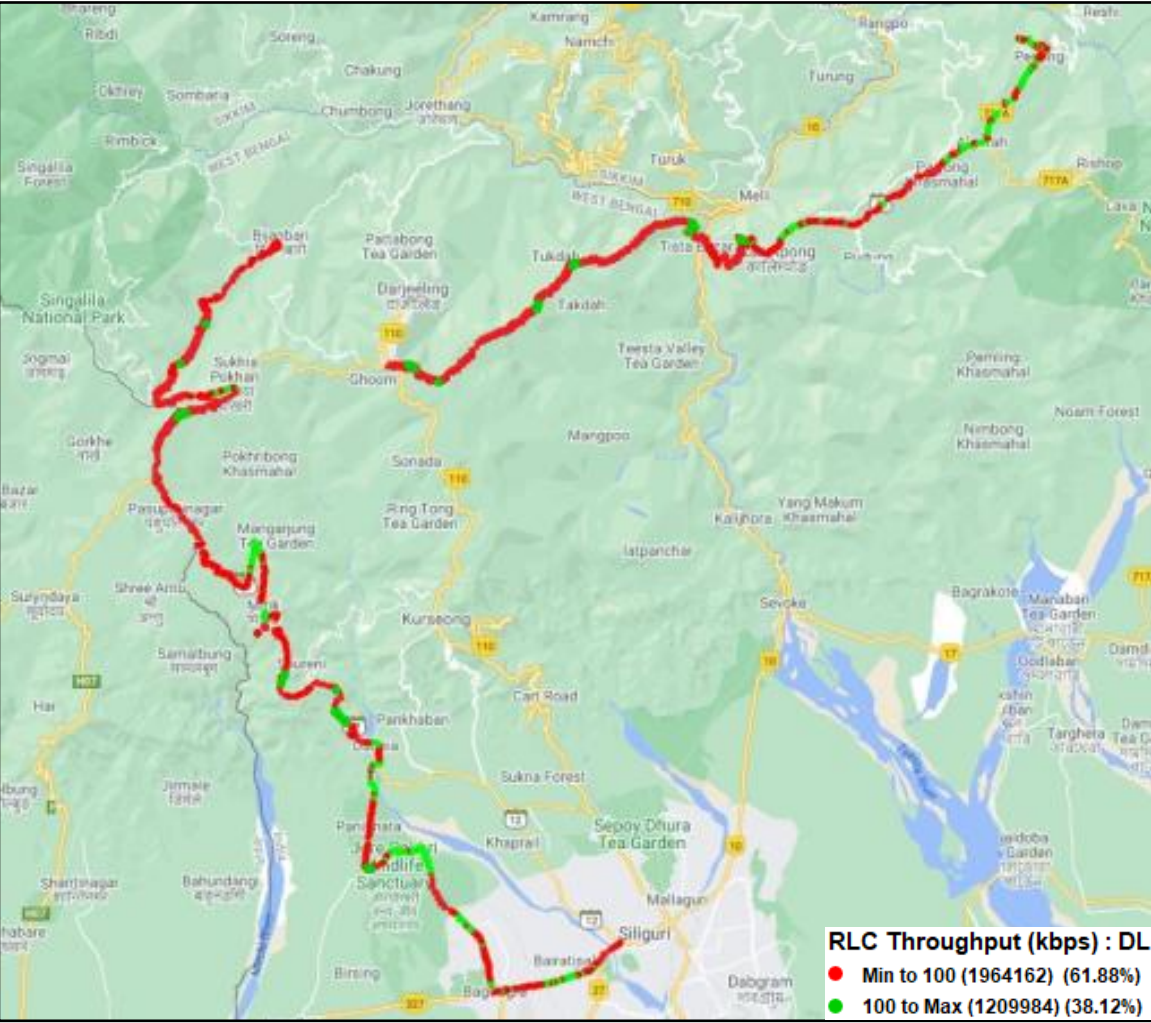
AVG. DOWNLOAD SPEED (Kbps)	83.58
% FILE TRANSFER COMPLETE	82.18%
DL throughput	Sample %
0 to 50 Kbps	53.80
50 to 100 Kbps	8.08
100 to 200 Kbps	24.44
200 to 300 Kbps	13.59
>300 Kbps	0.09
Total	100%

VIL

Dynamic Data Testing Complete 240 Kms

Data KPIs - Overall	4G
Average Download Throughput (Kbps)	7.34

4G

PDSCH Phy Throughput (kbps)
● Min to 2048 (6499624)   (10.56%)
● 2048 to Max (55049843) (89.44%)
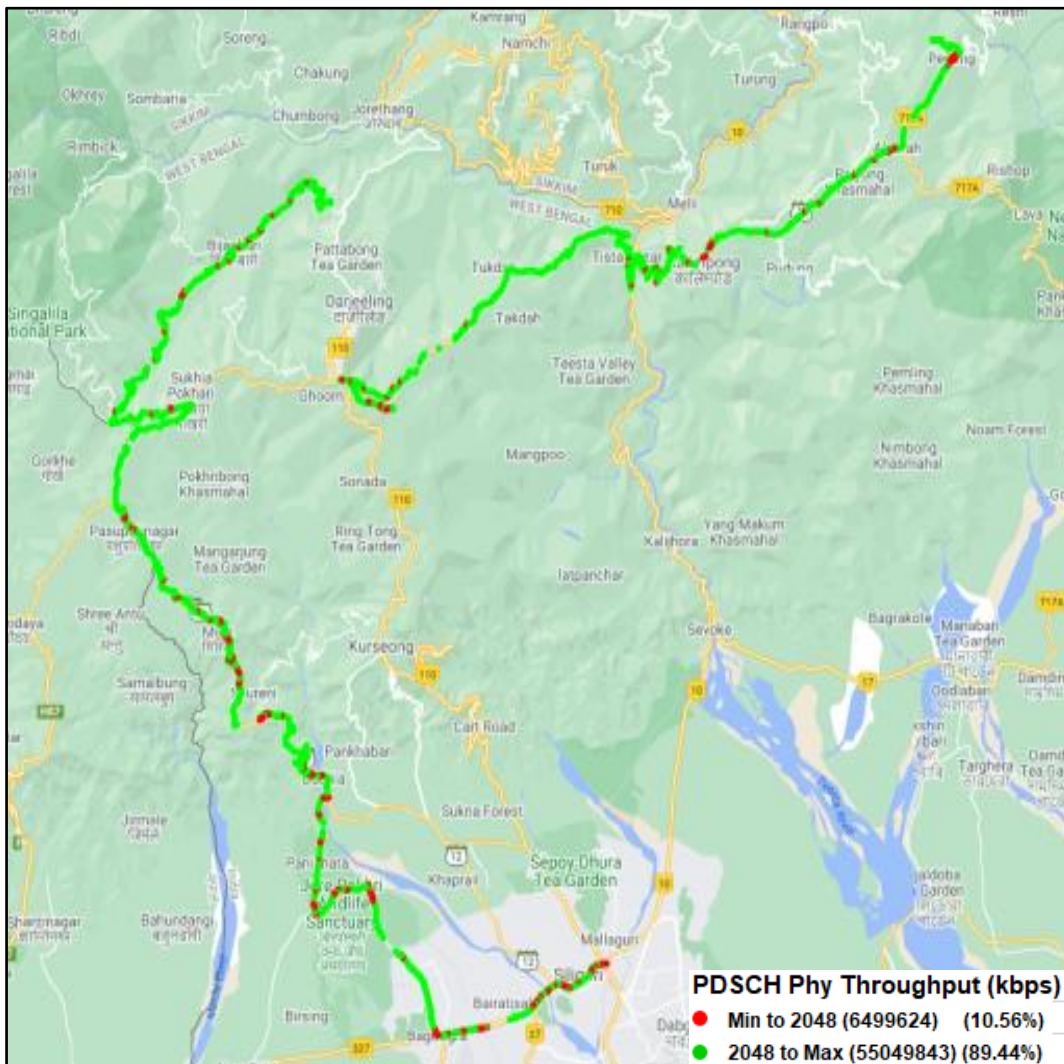
AVG. DOWNLOAD SPEED (Mbps)	7.34
% FILE TRANSFER COMPLETE	100%
DL throughput	Sample %
0 to 1 Mbps	7.05
1 to 2 Mbps	3.51
2 to 5 Mbps	27.99
5 to 10 Mbps	21.16
>10 Mbps	40.29
Total	**100%**